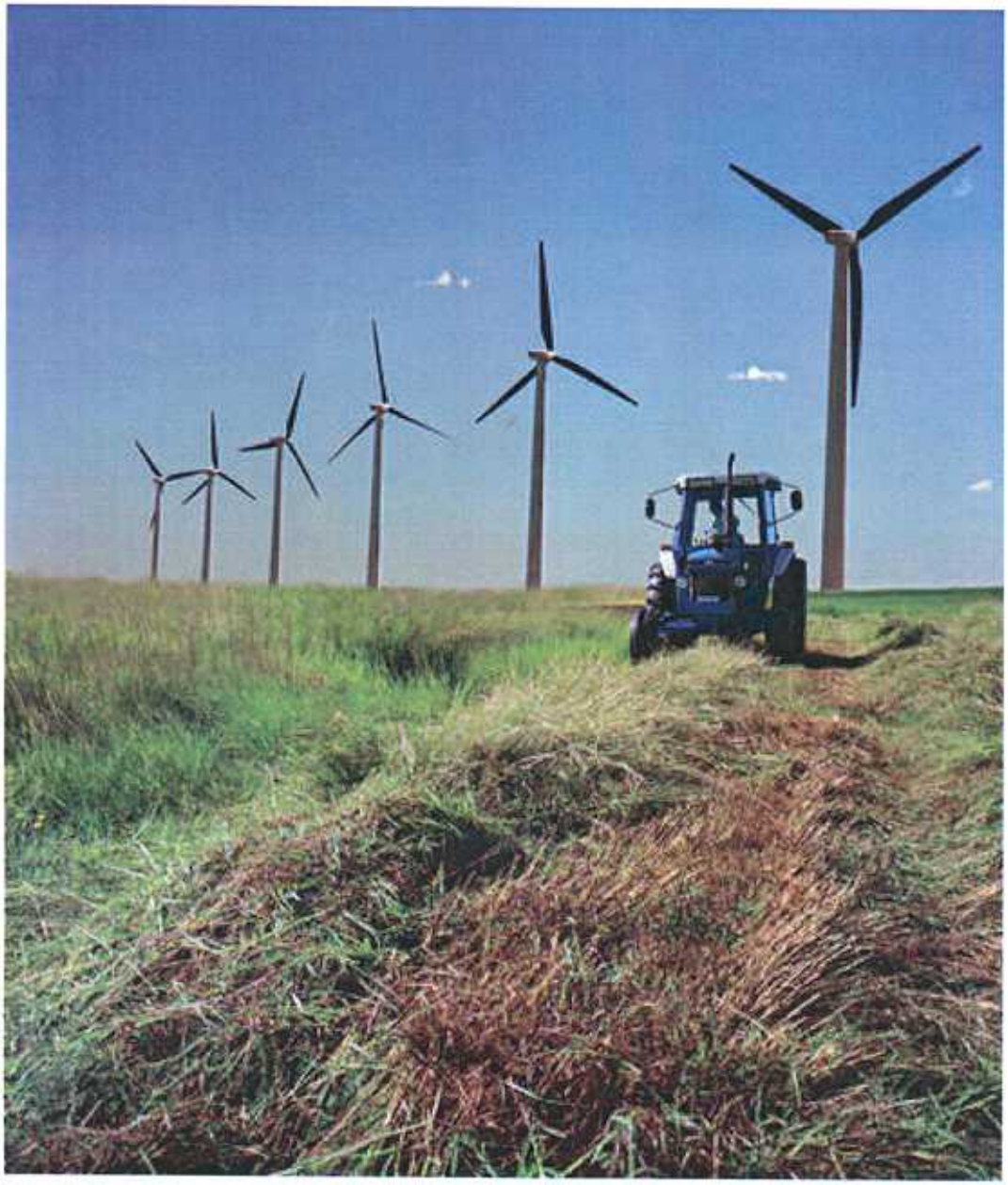
WIND POWERING THE MIDWEST



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INTRODUCTION

The purpose of this report is to serve as a quick reference for consumers and other advocates interested in learning more about wind activities and developments in the Midwest that includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Specifically, this report provides general information that includes a summary of the status and future of the wind industry, costs and economics, technology developments, state wind maps, listing of installations by state, upcoming activities, policies and financial incentives, and contacts at state government, manufacturers, utilities, developers and other organizations.

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An economic opportunity for America's Heartland

Introduction

Energy produced from the wind is now our fastest growing renewable resource, not only in the United States (U.S) but also worldwide. In fact, the growth rate of wind energy has surpassed that of natural gas, oil, and coal. During 2001 alone, nearly 1,700 megawatts of wind power was installed in the United States – a phenomenal 66% increase over the previous year. Wind capacity grew by another 10% during 2002, and by year-end 2003, the U.S. could have about 8,000 megawatts of wind power – enough to serve more than 2 million households.

The Midwest is home to several states with vast wind resources that are ranked in the top 20 in the U.S. Iowa and Minnesota, for example, trail only California and Texas in regard to installed wind energy capacity as of April 2003. The United States Department of Energy (U.S. DOE) is working with midwestern state governments, commercial developers, equipment manufacturers, energy companies, and environmental groups to harness this clean, renewable source of energy. The U.S. DOE's Chicago Regional Office covers the Midwest region of eight states: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

Wind Powering America: Powering Economic Growth

A program called Wind Powering America is the U.S. DOE's flagship effort, with a goal of producing 5% of the nation's electricity from wind by 2020. This would not only help meet the growing demand for clean sources of electricity, but would also add $60 billion in capital investment in rural America, provide $1.2 billion in new income for farmers and rural landowners, and create 80,000 permanent jobs from 2000 through 2020.

In short, wind energy represents a major economic opportunity for the United States, and a financial boon to midwestern farm economies. The first market is for large-scale wind turbine systems producing bulk power and selling it to energy companies. The second market for wind energy is small-scale turbines designed to serve a customer's own electricity needs.

In large-scale wind energy development, multiple turbines are typically installed on wind farms that feed power into the local utility grid, which distributes it to customers. The rule of thumb is that for each wind turbine on a property, the developer guarantees the landowner $2,000 or more per year, regardless of whether the machine is running. Farmers actually earn more than they would from agricultural crops; one Iowa farmer with three turbines on his land says, "It's like having an oil well in the sky."

Through Wind Powering America, the U.S. DOE is spreading the word on the benefits of wind energy, sponsoring conferences and workshops with Midwestern State governments to promote development at local and regional levels, and providing the technological and institutional support needed to ensure that wind energy continues to compete with other sources.

Renewable Energy: A Clean, Abundant Resource

America's supply of renewable energy is virtually infinite, since power from the wind and sun is inexhaustible – limited only by the ways we can imagine harnessing it. The U.S. Energy Information Administration predicts that electricity production from renewable energy resources will grow 2.1 percent per year through 2025.

Our abundant domestic supply of wind energy and other renewable resources helps reduce our dependence on fossil fuels, especially oil imported from foreign countries. This not only improves our domestic energy security position, but also insulates consumers from wild price swings that result from supply interruptions or volatility in commodity markets.

Wind power and other renewable energy sources are also friendly to our environment. Generating electricity from wind creates no greenhouse gases, which cause global warming, nor does it produce any air pollution. In fact, by displacing the use of fossil fuels, wind energy avoids the emission of millions of tons of carbon dioxide, sulfur and nitrogen compounds, and other air pollutants.

And large-scale wind farm development is highly compatible with farming, ranching, and other midwestern land uses. The wind turbines take up very little land – about one-fourth acre each – and do not require trucks going in and out, nor do they disturb farm animals or local wildlife. Concerns with wind power's noise have been minimized through continued technological development (see next section). Today, farmers can sit on their porch and watch the blades spinning just 200 yards away, yet not even hear them. Some farmers refer to the machines as "combines in the sky" and have called wind energy "the best crop we grow."

Recognizing this synergy, the American Corn Growers Foundation initiated the "Wealth from the Wind" program, which seeks to benefit small and mid-sized farms and rural communities by taking advantage of wind power's economic and environmental potential. "Wealth from the Wind" will explore, research, and implement programs to encourage farmer-owned wind farm cooperatives, leasing of farmland for commercial wind development, small-scale wind turbines for individual farm use, and other projects. Educational programs and information are also available to the agricultural community.

Wind Power Cost: Now It Competes with Traditional Sources

Until recently, renewable energy has been expensive, compared to power generated from inexpensive fossil fuels. That is no longer true. Working with the U.S. DOE to improve wind energy technology, the U.S. wind industry has reduced the cost of production by more than 80 percent since 1980. Just in the past 10 years, the cost of wind power has dropped roughly in half and should fall by another 30-50 percent by 2010 (Figure 1), due largely to technological advances. Today in some regions, electricity produced from wind can compete head-to-head with traditionally generated power when the federal production tax credit (presently at 1.7 cents per kilowatt-hour) for wind energy is included.

Overview of Wind Energy

How It Works: A Mini-Power Plant in the Sky

People have captured energy from the wind for thousands of years, using it to move ships, grind grain, and pump water. The blade of a wind turbine acts much like an airplane propeller, converting the wind's motion (kinetic energy) into useful power. By the late 1800s, windmills were being built to generate electricity.

In today's wind turbines, the rotating blades supply mechanical power through the rotor shaft to a gearbox (or transmission), which drives a generator to produce electricity. Modern wind turbines are mounted on high towers to take advantage of the stronger, steadier winds that prevail hundreds of feet up. You can think of the machine as a small power plant in the sky, using the wind as its fuel.

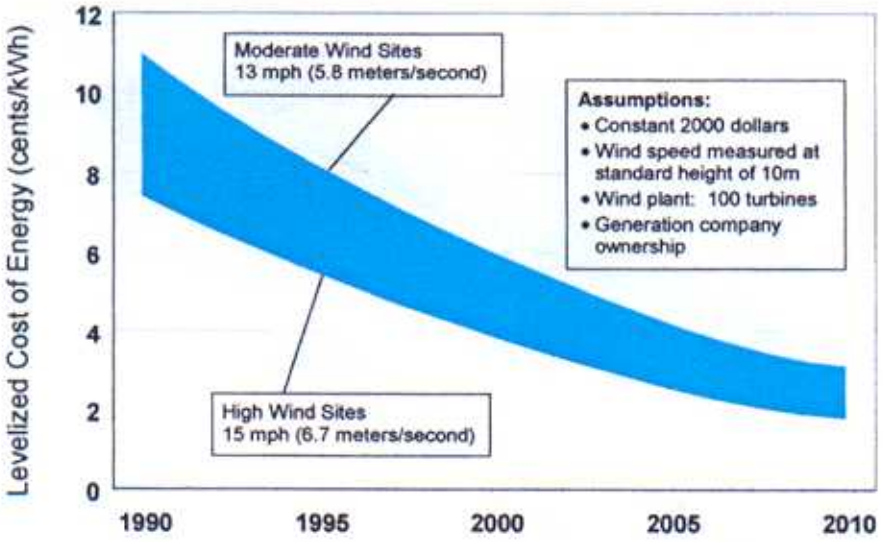

Figure 1: Levelized Cost of Wind Energy from 1990-2010

Recent Events: The Industry Grows Up

The popularity of wind energy has always fluctuated with the price of conventional fuels, so when oil prices skyrocketed in the 1970s, so did worldwide interest in wind power. Government research and financial incentives triggered the development and use of many new wind turbine designs over the past decades. Dozens of small wind power developers and manufacturers jumped into the market, then gradually consolidated into the major players operating today.

In the United States, the wind industry was born in California, where the state offered generous incentives to developers willing to take a risk, and federal legislation in 1978 began to encourage all forms of alternative power generation through PURPA (the Public Utility Regulatory Policies Act). Large wind farms built in California in the late 1970s and early '80s served as the test bed for new designs.

In Europe as well, governments and banking laws provided financial incentives to wind energy developers, and because conventional energy prices are much higher there, wind was better able to compete. Denmark and Germany in particular made steady progress on wind turbine technology and commercial projects. Today, Europe's wind industry is more mature, and European manufacturers dominate the large-scale wind equipment market.

For America, the fact that wind power was successfully introduced into Europe's existing electricity distribution grid without disruption showed that it could be done here too. Also, global warming concerns were focusing new attention on renewable energy. In 1992, the federal government introduced a tax credit for wind energy production, and America's wind industry has been enjoying a resurgence ever since. A two-year extension of this credit, which was included in President Bush's economic stimulus package and passed in spring 2002, will remain in effect through year-end 2003.

Now that the wind industry has endured its growing pains, midwestern states have begun to offer a smorgasbord of financial incentives for energy companies and individuals to invest in wind energy and other renewable resources. Income from siting wind turbines on agricultural land can also help sustain midwestern farm economies during lean times.

Technology Development: Driving Costs Down

During the 1980s and '90s, aggressive government research programs, here and in Europe, made huge strides in wind production technology, resulting in dramatically lower prices for wind power. Major advances were made in three areas:

- *Aerodynamics and design:* Aerodynamics is the study of air in motion and its interaction with objects moving through it. A better understanding of aerodynamics has allowed engineers to design wind turbine blades that are stronger, lighter-weight, and more powerful. Design engineers have also reduced the weight of other machine components, resulting in a ripple-down effect that allows lighter-weight housings, towers, and foundations.
- *Manufacturing techniques:* The process of manufacturing turbine blades and other wind system components has vastly improved, resulting in higher quality and better performance. For example, fiberglass blades no longer contain air bubbles that can cause failures. Materials and methods are constantly being improved to build more reliable, predictable machines.
- *Control and monitoring systems:* Computer control systems give engineers more information, allowing them to predict performance and to service a machine routinely, before it might fail. Modern machine controls use power electronics to operate at variable speeds, and detailed performance monitoring helps engineers operate the wind turbine at its highest efficiency.

Today's Wind Systems: Bigger, Quieter, and Safer

The current trend in wind turbine design is toward larger machines, in both physical size and generation capacity. Ironically, government programs of the 1970s were initially aimed at developing huge wind turbines, but researchers had to start with small machines to learn more about the loads and stresses that cause wear and tear on the components. Now that these stresses are becoming more precisely understood, engineers can optimize the safety factor in their designs and get more useful power out of the machine.

Today, manufacturers are successfully building ever-bigger, more efficient wind systems, allowing a given area of land to produce the same amount of power with far fewer machines and at lower costs. For example, five units each generating 750 kilowatts (kW) produce a total of 3.75 megawatts (MW) of power (1 MW = 1,000 kW). In the old days, this amount of power would have required 50 small, less efficient 75-kW machines.

This means that wind farms are much more cost-effective per acre of land that they occupy, and developers benefit from economies-of-scale in constructing fewer, larger machines, which co-exist easily with farming operations. The move toward higher capacity wind systems has been critical to making wind power competitive in energy markets.

Designers are now building commercial wind turbines that produce over 1 MW and are testing designs with more than 3 MW in capacity. Just a single blade on a modern machine can be more than 80 feet long – about the length of a basketball court – and the base of the blade is large enough to drive a car into. Some wind systems today have elevators inside the tower for workers to access the equipment at the top.

Engineers have also designed turbines that operate more quietly without sacrificing efficiency. Mechanical noise has virtually disappeared, while aerodynamic blade designs have reduced the swishing sound of the blades. Also, today's large machines spin more slowly to produce the same power as a small machine spinning faster. Natural noise such as the wind blowing through trees and shrubs usually masks the sound of modern wind machines at distances of 200 yards or more.

In addition to the wind turbine equipment itself, the success of wind farms depends very much on finding just the right spot for the machines, since the economics of wind energy production improves greatly at sites with strong, steady winds. When the wind speed doubles, the amount of energy it contains increases eight times. Wind farms themselves are also growing in size, according to Clean Edge, Inc., the Clean-Tech Market Authority (San Francisco). New farms are now reaching utility-scale, with some approaching 300 MW in size.

The U.S. DOE, individual state governments, and the wind industry have worked both independently and cooperatively for years to monitor wind speeds and directions at sites all over the U.S., leading to detailed wind potential maps for many states nationwide. Still, developers hoping to install large farms must "prospect" for the best winds, using techniques and equipment that are constantly being improved.

Wind Energy's Future: Full Speed Ahead

Wind power is the fastest growing energy technology in the world today. Globally, wind power totaled close to 24,000 MW of installed capacity in 2001, with 4,261 MW of this in the United States. By year-end 2002, U.S. capacity had grown to 4,660 MW (Figure 2).

Worldwide, installed wind capacity increased during 2002 by 28%, adding a record 6,868 MW and reaching a total of more than 31,000 MW. According to the American Wind Energy Association (AWEA), the world's total wind power capacity has quadrupled over the past five years. The global wind industry is expected to expand from $5.5 billion in 2002 to about $49 billion in 2012, says the Clean-Tech Market Authority.

During 2002, America's wind production capacity reached 4,660 MW – enough to serve more than 1.3 million households, according to AWEA. Despite overall retrenchment in the broader energy industry, 410 MW of wind power was installed in 2002. The U.S. now ranks third in the world in terms of wind power capacity, behind Germany and Spain.

Uncertainty surrounding extension of the federal government's tax credit slowed growth somewhat during 2002. However, the credit eventually was extended through year-end 2003, and AWEA projects that with new developments in 2003, the total installed capacity in the U.S. may increase to over 8,000 MW. The wind industry is proposing that in the future, the tax credit be extended for multiple years rather than one year at a time to combat the boom-bust cycles associated with short-term credits.

MIDWESTERN WIND POWER: States Take the Lead

Minnesota: A Midwestern Powerhouse of Wind Energy

This northernmost midwestern state has a wind generation capacity of about 320 MW, concentrated in the southwestern corner of the state. In terms of wind resource, Minnesota has the largest potential in the Midwest and America's ninth-largest potential (Figure 3.

Minnesota has ongoing monitoring and mapping projects to characterize the wind power resource statewide. In late 2002, Minnesota's Department of Commerce released its 14th *Wind Resource Analysis Program (WRAP) Report*, which presents the newest data on the state's wind energy potential.

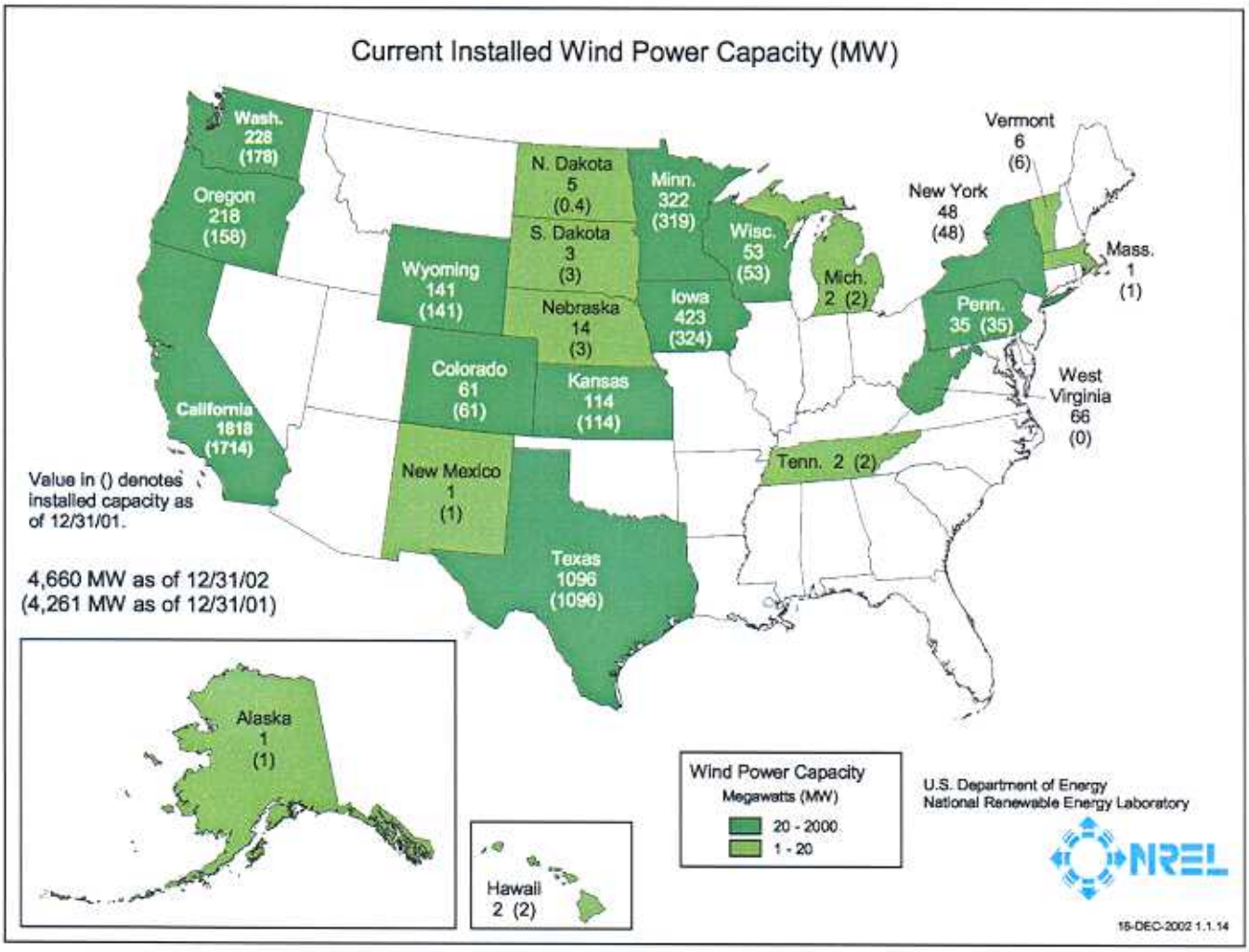

Figure 2: U.S. Wind Power Capacity, Year-End 2002
Source: U.S. National Renewable Energy Laboratory

More than 90% of Minnesota's wind power comes from large wind farms, while the rest is generated by small wind turbines that are independently owned and operated. Minnesota's largest electric utility, Xcel Energy (formerly Northern States Power), buys most of the wind energy produced statewide, under an agreement that allows the utility to store nuclear waste in exchange for purchasing wind power. During 2002, Xcel bought 425 MW of wind energy – more than 1.3 million megawatt-hours (MWh) per year – and will contract for the purchase of another 400 MW through 2012.

Incentives and Education: Helping Minnesota's Wind Power Grow

Several financial incentives are provided by Minnesota's Department of Commerce to encourage wind energy development. Minnesota is unique in offering payments for actual wind energy output, at a rate of 1.5 cents per kilowatt-hour (kWh) generated by systems less than 2 MW in capacity. Also, wind power equipment is exempt from sales tax, and small wind systems

(less than 250 kW) are exempt from property taxes and production taxes. For larger systems, in lieu of property tax on the value of the wind equipment, owners pay production taxes based on system capacity (between 250 kW and 2 MW, 0.012 cents/kWh; 2-12 MW, 0.036 cents/kWh; over 12 MW, 0.12 cents/kWh).

A cornerstone of Minnesota's program is net metering for operators of small wind turbine (40 kW or less) that are connected to the utility grid. When the machine is generating more power than the customer is using, the electric utility meter turns backwards, and the customer's bill is credited for the electricity produced at the average retail rate – which distinguishes Minnesota's (and Wisconsin's) net metering programs from those of most other states, where the so-called "buyback" rates are lower. Minnesota is also the only midwestern state where net metering is mandated in statute by the state legislature.

In addition, state legislation requires electric utilities to offer customers the option to purchase "green" power generated from renewable sources including wind energy systems. Great River Energy and its member utilities sell blocks of wind power (certain amounts of kWh/month) to customers for a small premium through its WindSense program. Moorhead Public Service's *Capture the Wind* program has the largest percentage participation rate in the U.S., at 7%. Similar options are available through other green choice programs, including Wellspring Renewable Energy offered by the Cooperative Power Association and Great River Energy and Minnkota Power Cooperative's *Infinity Wind Energy.*

Minnesota is also busy educating community leaders, farmers, and rural landowners about the benefits of wind power through a project called Windustry, operated by the state's Institute for Agricultural and Trade Policy. In November 2002, Windustry held a conference in Minneapolis, "Wind Energy: New Economic Opportunities," which featured four topics:

- Options and strategies for reaching Minnesota's goal of 10% renewable generation by 2015
- Establishing a vibrant wind industry in the state and the Midwest
- Community-based opportunities to develop wind resources
- Citizen and landowner workshops

Minnesota's Wind Energy Developments

Most of the state's wind power comes from its largest wind farm, developed by Enron Wind Corp. in 1998-99 (GE Power Systems acquired Enron Wind in 2002). GE Wind operates 281 wind turbines near Lake Benton that produce almost 211 MW. Xcel Energy buys all of this power, as well as power generated at the 25-MW Buffalo Ridge wind farm in Murray County, developed in 1994 by Kenetech Windpower.

Also in the Buffalo Ridge area, three 660-kW units at the Chandler Hills wind farm, developed by enXco and Project Resources Inc., began generating about 2 MW of power in 1998; another six machines at Chandler began producing an additional 4 MW of wind energy in 2001.

Minnesota's Douma family owns the Chandler Hills wind farm site. More than 100 other landowners have arrangements that allow developers to operate wind turbines on their property. Typically, each machine uses about a quarter-acre, and the site owner receives lease income of about $2,500-$5,000 per year per turbine.

In early 2003, a new electricity transmission line was approved by Minnesota's utility regulators to carry power from Buffalo Ridge wind farms to the Minneapolis-St.Paul metro area. The transmission line, proposed by Xcel Energy, is projected to be in service in 2006. One

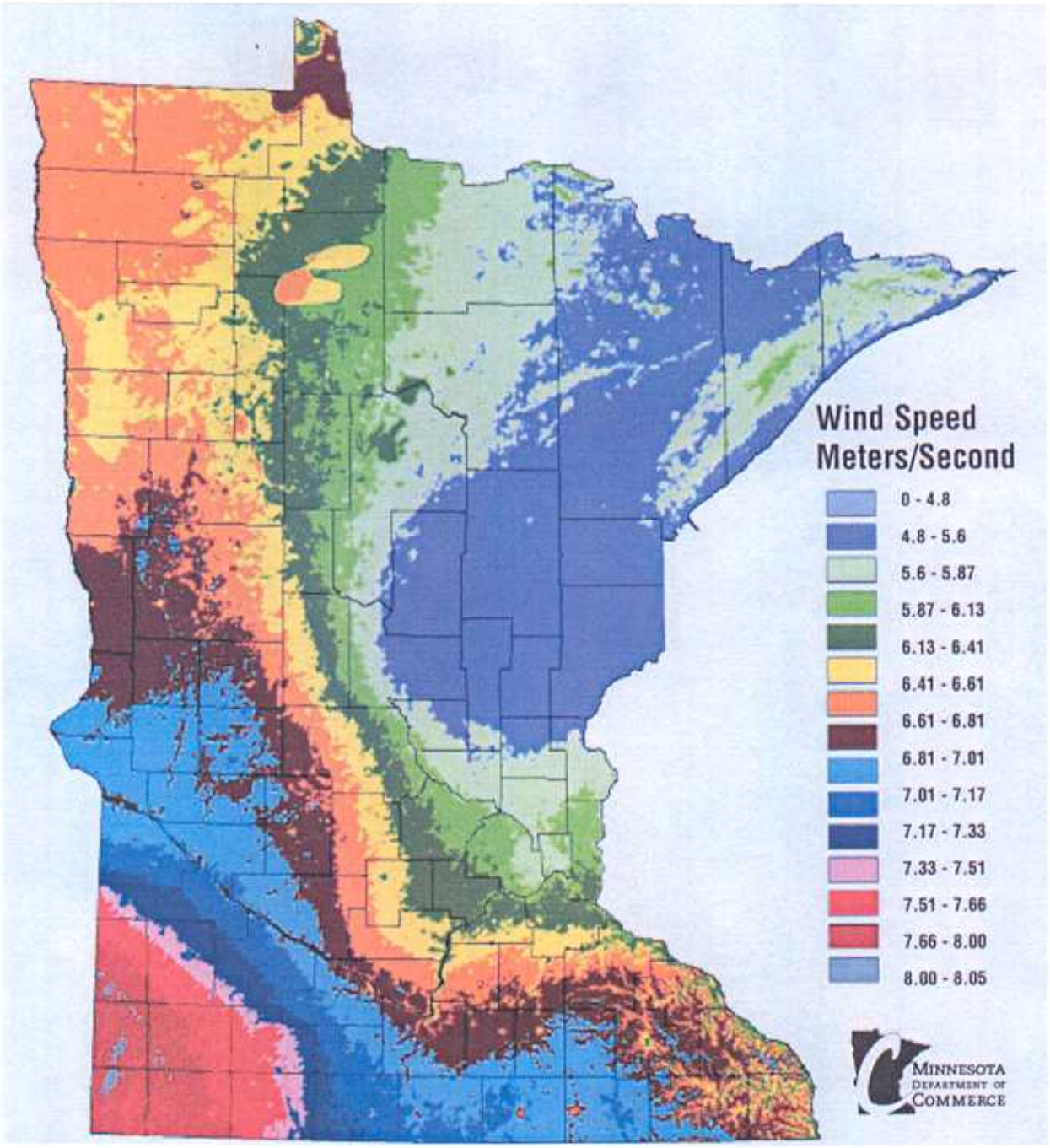

Figure 3: Minnesota Wind Speeds Measured at 70 Meters
Source: Minnesota Dept. of Commerce, Wind Resource Analysis Program (WRAP) Report, 2002

condition of the approval is that a total of 825 MW of wind power must be built in the same time frame, said SolarAccess.com.

The decision could dramatically accelerate Minnesota's wind power development, adding 365 MW of wind power to Xcel's existing commitment of 460 MW (installed or under contract). Separately, Minnesota's utility commission also required Xcel to purchase up to 60 MW of its

total wind power from developments owned locally by farmers, communities, and small businesses in southwestern Minnesota.

A cooperative led by Great River Energy became the first utilities in the Midwest to offer customers the opportunity to purchase some or all of their power from wind. The state's wind projects are listed in Table 1.

In 2003, the U.S. DOE will work with the Minnesota State Energy Office to organize a wind energy workshop for Native Americans to educate/promote development of wind resources that exist on Tribal land.

Iowa: Top Wind Energy Producer in the Midwest

As America's tenth-windiest state, Iowa has the potential to produce nearly five times its own electricity demand from wind energy. This amount of power could supply over 5 percent of total U.S. needs. Nearly 40 percent of Iowa's land area has wind production capabilities (Figure 4), giving the state a potential capacity exceeding that of California.

Currently, the state generates about 325 MW of power, mostly from commercial-scale wind turbines, placing it third in production nationwide, after California and Texas. In addition, the state requires its investor-owned utilities to purchase a portion of their generation from renewable sources including wind power.

Incentives and Education: Helping Iowa's Wind Power Grow

Iowa provides a variety of financial incentives to encourage wind energy development, including loans and property and sales tax exemptions. For example, Iowa offers a state sales tax exemption for the total cost of wind energy equipment and all materials used to manufacture, install, or construct wind systems. Also, wind energy equipment receives preferential treatment in property tax assessments. Iowa also has a net metering law, and beginning in 2004, all electric utilities, including those not regulated by the state utilities board, must offer green power options to their customers.

The Iowa Energy Center (Center), a non-profit organization administered by Iowa State University in Ames, supports wind developments through wind research and demonstration projects, as well as providing on-line wind assessment studies. The Center also administers the state's Alternate Energy Revolving Loan program, which supports residential, commercial school and independent power producer since its inception in 1996. Wind energy education is also supported by the University of Northern Iowa, which operates the Center for Energy and Environmental Education.

Waverly Light and Power and the City of Waverly, along with the University of Northern Iowa, established the Midwest Wind Energy Program to demonstrate the advantages of wind energy and to provide hands-on training, university classes, and seminars. Data from monitoring the utility's first, 80-kW wind turbine was supplied to the American Public Power Association so that other municipal utilities were able to learn from Waverly's experience. (Note: The turbine was retired in 2001).

Iowa's Wind Energy Developments

Most of the state's wind power comes from three areas, Storm Lake (near Alta), developed by Enron (now GE Wind); Clear Lake, developed by FPL Energy; and Joice, developed by

Northern Iowa Windpower. Together, these wind farms can produce about 315 MW of electricity – equivalent to the energy consumed by more than 97,000 typical homes.

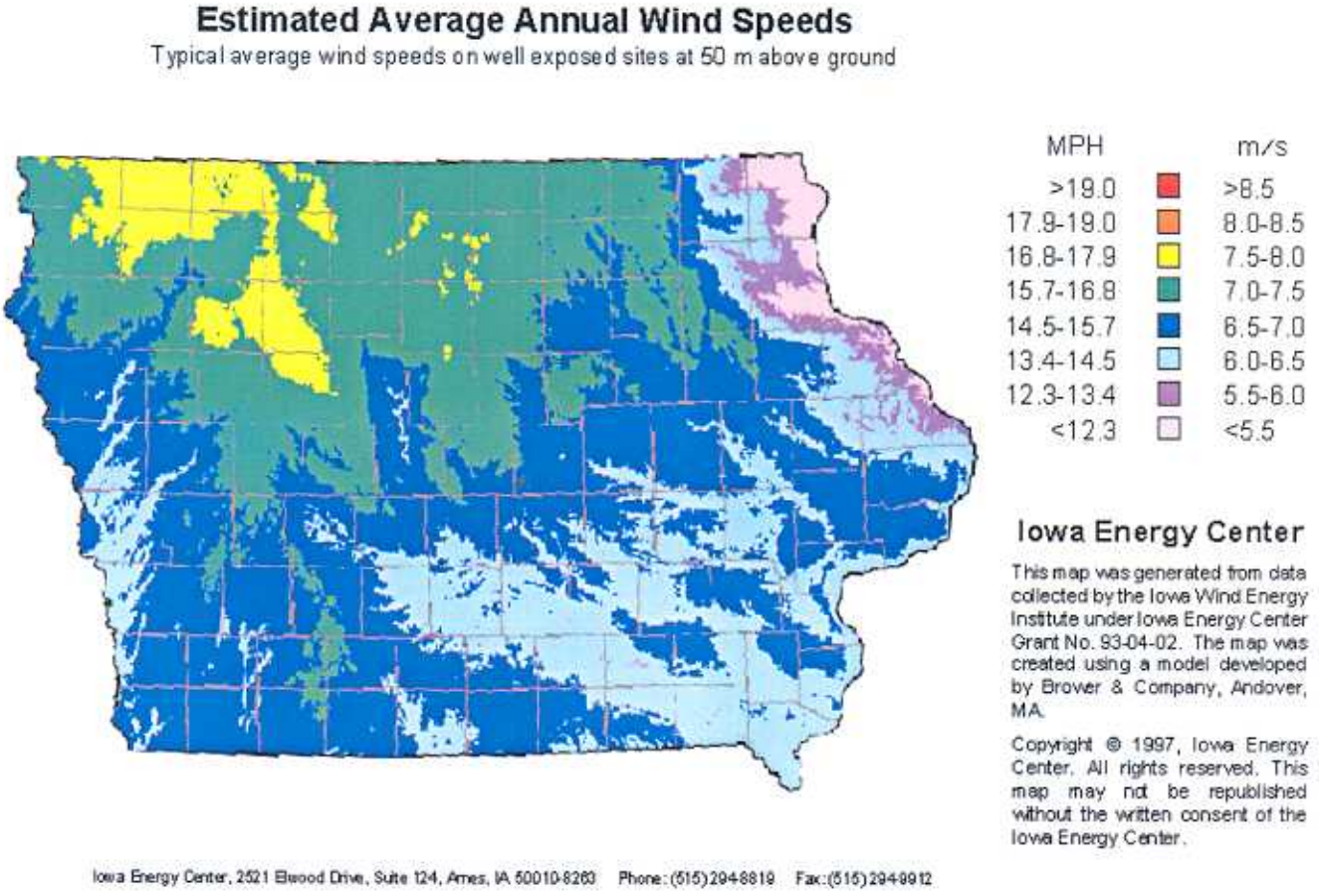

Figure 4: Iowa's Estimated Average Annual Wind Speeds Measured at 50 Meters
Source: Iowa Energy Center

In 2002 FPL Energy began developing a new, 98-MW wind farm, with more than 100 turbines, in northern Iowa's Hancock County. Also in 2002, Clipper Windpower began developing a 43-MW wind farm near Spirit Lake. The 1.5-MW turbines at the Clipper wind farm are the largest capacity wind turbines in Iowa. Alliant Energy and several local cooperatives and municipalities will buy the output from these two new wind farms.

Iowa's love affair with wind power dates back to the days before the big players came onto the scene. In 1993, Iowa became the site of the first wind turbine owned and operated in the Midwest by a public utility, Waverly Light and Power; this was also Iowa's first utility-scale turbine. Since then, a group of seven municipal utilities formed the Iowa Distributed Wind Generation Project and installed three 750-kW turbines near Algona to gain first-hand experience at running a wind farm. In 1999, Waverly installed two 750-kW turbines that are part of the Storm Lake Wind Facility.

In 1993, Spirit Lake School District was the first school to install a wind turbine to offset electricity costs. The 250-kW system saves about $25,000 per year, and the school installed a second, 750-kW machine in 2001. Since then, several other Iowa school districts have begun saving money by operating their own wind systems. Forest City's system reduces energy costs by about $50,000 annually, and Akron-Westfield's is estimated to save more than $60,000 per year.

Schafer Systems, a local plastics manufacturer in Adair, installed a wind energy system in 1995 to generate about 65% of the factory's power requirements. And in 1996, Iowa's Department of Natural Resources and the Iowa State Fair Board sponsored construction of a 10-kW wind turbine at the fairgrounds, which demonstrates the technology to a million visitors each year.

More recently, Waverly Light and Power has continued to pioneer Iowa's utility wind developments, not only by installing a fourth, 900-kW turbine but also by creating the Iowa Energy Tags Program, where the utility sells wind power certificates called tags to its customers and the public. Each tag, costing $50, represents the environmental benefit of wind generation of 2,500 kWh, offsetting fossil fuel production of the same amount of energy. Proceeds go toward additional wind generation by the utility.

In recognition of this program, Waverly Light and Power won the 2002 Paul Rappaport Renewable Energy and Energy Efficiency Award from the U.S. National Renewable Energy Laboratory, which noted the utility's "vision, innovation, and courage."

On March 27, 2003, MidAmerican Energy Co., based in Des Moines, announced its plan to develop a 310-megawatt project on a site yet to be determined. The $323 million project (180 to 200 turbines) will be the largest wind farm on land anywhere in the world when it is completed in 2006.

On April 24, 2003, the U.S. DOE along with the State of Iowa Department of Natural Resources co-hosted a one-day Green Energy Workshop that focused on wind development opportunities and issues for representatives of rural electric cooperatives and municipal utilities.

The state's wind projects are listed in Table 2.

Wisconsin: Using the Latest Wind Technology

In August 2001, Wisconsin began operating its biggest wind farm, which was at the time the largest one in America east of the Mississippi River. Built and operated by FPL Energy, the Montfort wind facility in Iowa County uses twenty huge Enron wind turbines, each generating 1.5 MW of power. This project brought Wisconsin's wind energy capacity to about 53 MW, with much of the state's potential wind resource concentrated in eastern areas (Figure 5). The Wisconsin Division of Energy, in cooperation with utilities, completed three years of statewide wind monitoring and mapping to characterize the wind power resource. In December 2002, Wisconsin Energy Corporation (We Energies) issued a request for proposal for up to 200 megawatts of wind power generation. We Energies plans to have these projects to be in service by December 2004.

Like Minnesota and Iowa, Wisconsin sees wind energy as an economic opportunity, especially for farmers and other rural landowners who could receive thousands of dollars in annual income for each wind machine sited on their property.

Incentives and Education: Helping Wisconsin's Wind Power Grow

Wisconsin policies and public benefit funds provide a variety of financial incentives to encourage wind energy development. These include a property tax exemption from any value added by renewable energy equipment and state grants and low-interest loans for renewable energy projects.

Although renewable sources already supply 5 percent of Wisconsin's energy, most of this is wood used for heating, along with some hydropower. In 1999, Wisconsin passed a law requiring most electricity suppliers to provide a rising percentage of energy generated from renewable sources to their customers, starting with 0.5 percent in 2001 and increasing to 2.2 percent by year-end 2010. Wisconsin was America's first state to have a so-called "renewable portfolio standard" in advance of retail competition.

Several Wisconsin utilities have pioneered green pricing programs including wind power options. Madison Gas and Electric offers customers blocks of 150 kWh for a monthly premium of $5/block. Other green pricing programs include Alliant Energy's Second Nature, We Energies' Energy for Tomorrow, Wisconsin Public Service's NatureWise, Wisconsin Public Power's Renewable Energy Program, and the Dairyland Power Cooperative's Evergreen Renewable Energy Program.

Wisconsin has a net metering program that is limited to systems of 20 kW or less and applies only to customers of investor-owned utilities.

Wisconsin's Wind Energy Developments

In addition to the 30-MW Montfort wind farm, Wisconsin enjoyed a resurgence of wind energy projects during the 1990s. Madison Gas and Electric owns and operates an 11.2-MW wind farm in Kewaunee County, and in 1999, Wisconsin Public Service began operating the 9.2-MW Lincoln Wind project, which generates about 17 million kWh per year.

A consortium of utilities initiated the Wind Energy Research Project in 1989 with an extensive study of 19 sites, resulting in construction of a 1.2-MW wind farm. The U.S. DOE and the Electric Power Research Institute provided support to this project. Land for the wind turbines was leased from dairy farmers Mike and Sandi Zirbel. Near real-time energy production can be viewed at the Wisconsin Wind Project website (www.wisconsinwindproject.com).

On April 11, 2003, the U.S. Department of Energy, State of Wisconsin Division of Energy, State of Illinois Department of Commerce and Economic Opportunity, and Illinois Clean Trust Foundation co-sponsored a utility-scale wind workshop for landowners and farmers. Key topics presented at this one-day event included siting and permitting, landowner's role in development, available wind resources in Wisconsin and Illinois, financial assistance, etc.

The state's wind projects are listed in Table 3.

Other Midwestern States: Gearing Up for Wind Power

The vast resources of wind energy available throughout the Midwest are generating interest among other midwestern states, too, resulting in commercial wind power developments (Table 4). Nearly all of the states have some form of property tax exemption or preferential treatment for wind energy and other renewable systems.

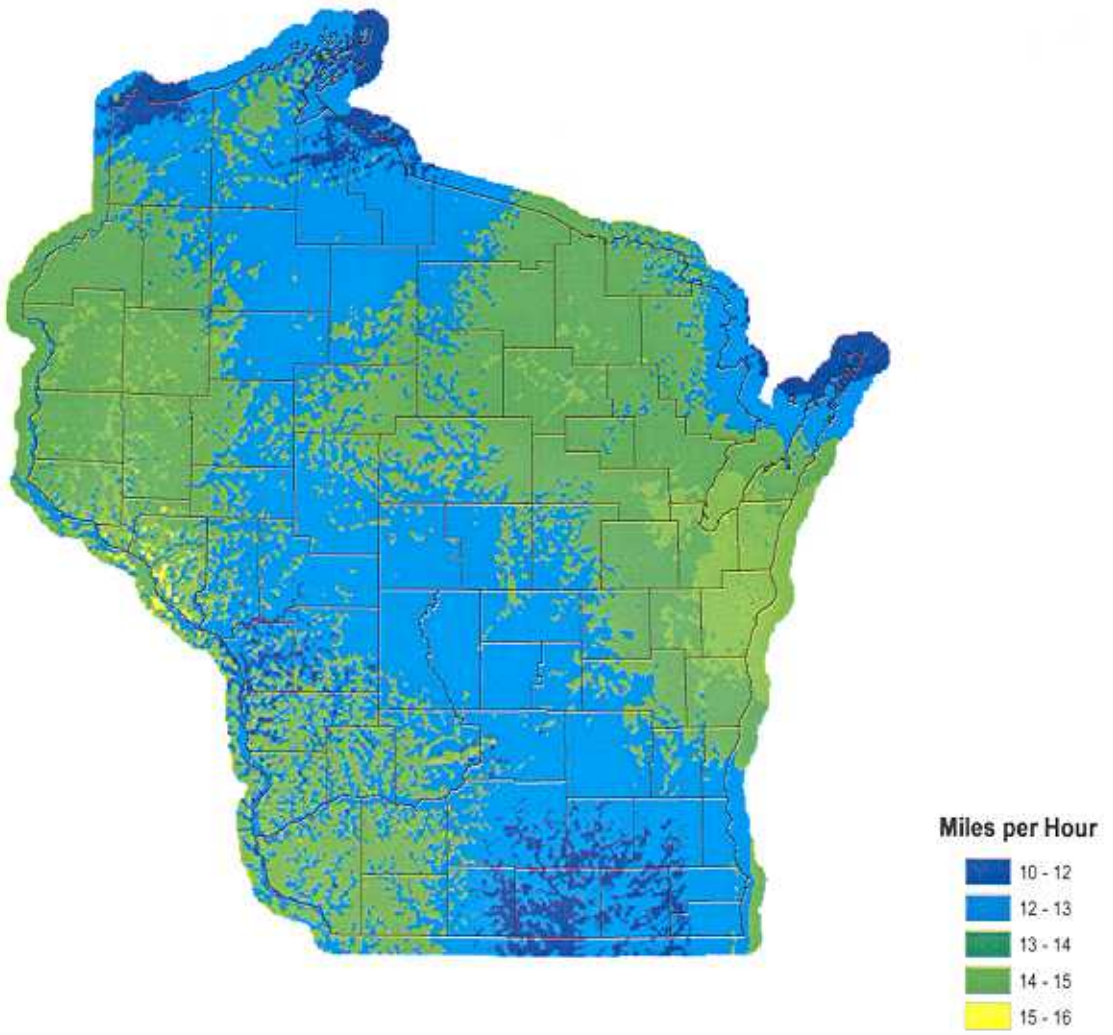

Figure 5: Average Annual Wind Speeds in Wisconsin (@ 60 meters)
Source: Wisconsin Division of Energy (January 2003)

Some also have sales tax exemptions, grants, net metering, and green pricing programs either in effect or being planned. A summary of these financial incentives is shown in Table 5.

Illinois

On July 11, 2002 then-Governor George Ryan announced a $2.75 million renewable energy grant to Minneapolis-based Navitas Energy Inc., to develop a "utility-scale" wind-to-energy farm in Northern Illinois. The Mendota Hills Wind Farm in rural Lee County, when completed in late 2003, will have 36 wind turbines and would be capable of generating 133 million kilowatts of emission-free electricity, or the equivalent generation to meet the annual needs of about 15,000 households.

On June 26, 2002 local utility Commonwealth Edison (ComEd) announced that it would purchase the full output of a 32-turbine wind farm in Bureau County. Illinois Wind Energy LLC is the developer for the $60 million Crescent Ridge Wind Project. The turbines, which are situated on 20 acres, are to be built near Providence, Milo and Tiskilwa in Indiantown and Milo townships in Bureau County. The wind farm will generate approximately 48 megawatts of energy – enough energy to power 18,000 homes, when completed in late 2003.

In 2002, then-Governor Ryan issued an executive order committing the state to purchase at least 5 percent of its electricity from renewable sources by 2010 and 15 percent by 2020. The order applies to electricity used by buildings owned or operated by agencies under the governor's control.

In 2001 the state legislated an explicit goal that at least 5 percent of the state's production and use of energy be derived from renewable forms by 2010 and at least 15 percent by 2020.

In November 2001, the Illinois Department of Commerce and Community Affairs (now the Department of Commerce and Economic Opportunity), along with the U.S. DOE's Chicago Regional Office, the City of Chicago, Commonwealth Edison, U.S. EPA – Region V, American Corn Growers Association, and other organizations, hosted the first wind workshop and exhibition in the state. The successful one-day event focused on wind development issues and opportunities and was attended by approximately 350 people.

The state has in place a grant program that funds wind development projects. For small wind farms (10-990 kW), it funds 50 percent of the project costs up to $2.00/Watt with a maximum grant amount of $400,000. For medium wind farms (1-10 MW), it funds 35 percent of the project costs with a maximum grant of $1,000,000. For large wind farms (greater than 10 MW), it funds 10 percent of the project costs with a maximum grant of $2,750,000.

Another potential source of financial assistance is the Illinois Clean Energy Community Foundation, which offers grants and loans funded by income from a $225 million endowment. The local utility, ComEd, also offers an experimental green pricing program for customers who own and operate small wind systems (up to 40 kW) on their premises.

As of April 2003 approximately 100 MW of wind power are under development or planned for Illinois in the near terms (see table 4). The National Renewable Energy Laboratory's wind resource map released in 2001 indicates that the state could support more than 3,000 MW of peak wind capacity (Figure 6). Based on this potential, the Environmental Law and Policy Center of Chicago, at a wind town meeting on March 2003, reported that an additional 1,700 MW of wind developments are being planned in the next several years. Once completed, the added capacity would catapult Illinois as one of the leading wind development states in the United States.

Ohio

The Ohio Department of Development's Office of Energy Efficiency (OEE) hosted its first wind power conference in November 2002, when more than 350 participants attended to learn about wind energy development in the state. Green Energy Ohio (GEO), subcontractor to OEE and a statewide non-profit renewable energy organization with a Wind Committee based in Cleveland, organized the one-day event. GEO is dedicated to promoting wind power and other renewable energy in the state.

Other key co-sponsors included U.S. DOE's Chicago Regional Office, the American Corn Growers Association, and Green Mountain Energy Co., the nation's largest retail provider of

less-polluting electricity. Small wind experts Paul Gipe, Mick Sagrillo, and Mike Bergey participated among the 24 speakers and 24 sponsors and exhibitors.

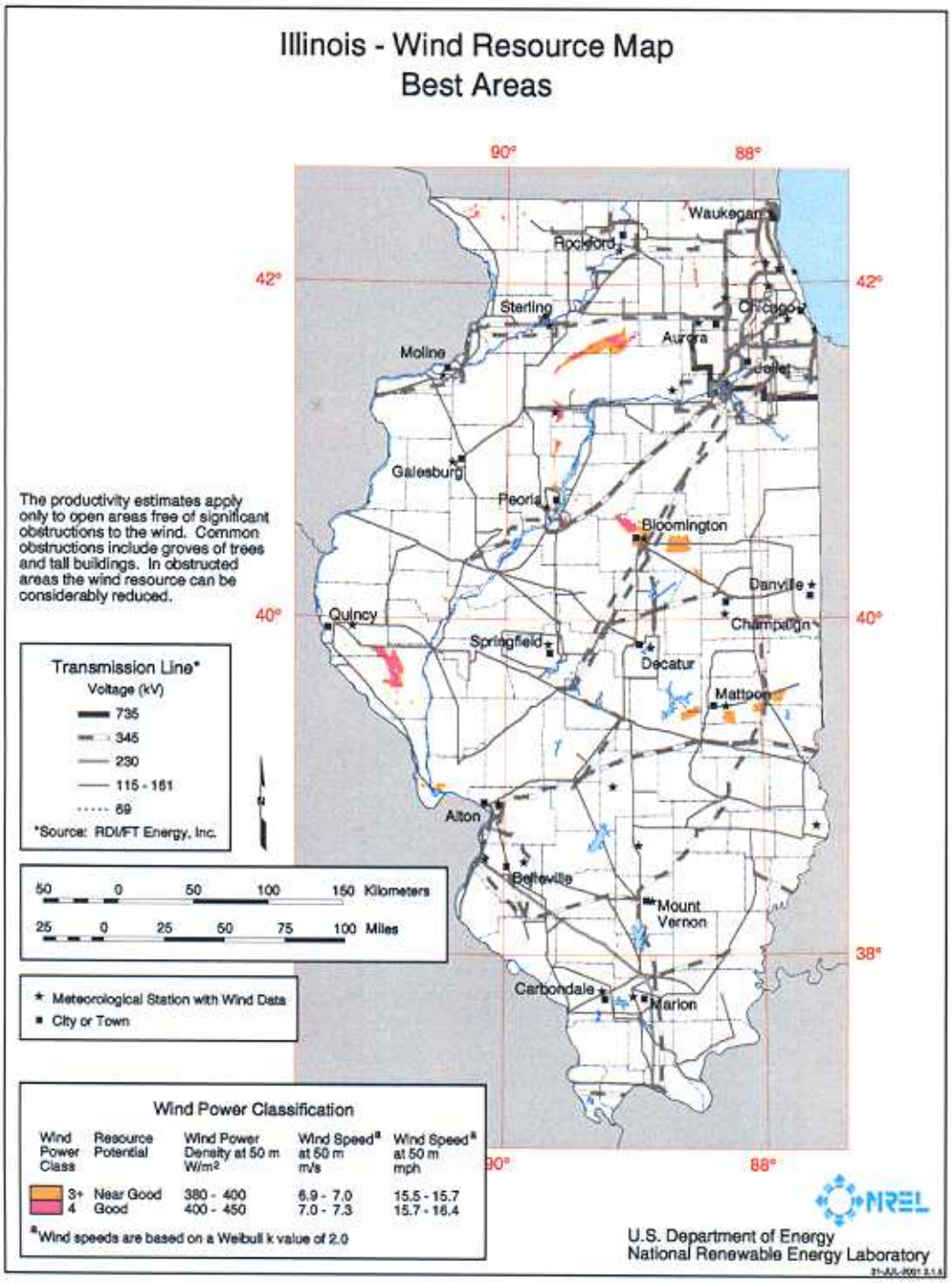

Figure 6: Illinois Wind Resource Map
Source: U.S. National Renewable Energy Laboratory (November 2001)

Conference participants received a 500-page Ohio Wind Power Tool Kit developed by GEO, along with copies of the U.S. National Renewable Energy Laboratory's "Small Wind Electric Systems: An Ohio Consumer's Guide." The Tool Kit incorporates case studies of 13 small wind systems across Ohio, including 7 wind/solar hybrid systems.

The conference also featured a dedication program for the Glacier Ridge Metro Park Wind Turbine, a 10-kW educational project installed by GEO near Columbus. A photovoltaic (PV) unit is planned for this installation as part of an eventual $300,000 learning center on residential-scale wind and solar applications. Small wind/PV units are expected to be operating in 2003 at Lake Farmpark near Cleveland and at the Toledo Harbor Lighthouse some 8 miles into Lake Erie on the Port of Toledo shipping channel.

Presentations at the conference covered wind resources and technology, project development, and benefits and barriers to wind installation. More than 70 conference participants expressed interest in an Ohio Wind Working Group to follow up on the conference. An extensive website with conference speaker presentations, Tool Kit, and GEO wind monitoring appears at www.GreenEnergyOhio.org.

Due to interest generated at the Ohio wind conference, the U.S. DOE – Chicago Regional Office in 2003 will be providing financial support to the State of Ohio's Department of Development for the following activities: (1) Development of a new state wind resource map, and (2) Organization by its State Wind Working Group for a series of wind meetings with its key stakeholders for the purpose of gathering information to craft a state-wide wind implementation plan.

GEO is promoting commercial wind development in Ohio, while Green Mountain Energy has initiated its own wind-monitoring program. Since 1996, GEO has monitored several sites, collecting wind speed and direction data using industry standard equipment (see Figure 7).

GEO has worked to identify additional sites by building relationships among those interested in Ohio's wind power. One future site under consideration is the Cleveland Water Crib, the main intake from Lake Erie into the city's water system. This site and other offshore areas in Lake Erie hold potential for the high average wind speeds needed to support commercial operations.

Community Energy Inc., a corporation located in Pennsylvania involved with wind energy marketing, also participated in the Ohio Wind Power Conference and indicated that it has begun wind assessment in the state, noting that Ohio appeared little different from Illinois or Pennsylvania where the firm has developed commercial wind farms.

GEO also offers public tours of Ohio buildings that use wind and solar power. One example is Robert Howard's 4.5-acre Victory Farms in Franklin County, where an 18-kW wind turbine and PV hybrid system has been operating since 1995. The site was featured on the cover of the September/October 2002 *Solar Today* magazine, along with a feature article on GEO's activities and Ohio's green energy programs.

Green Mountain Energy serves several hundred thousand Ohio residential customers through the Northeast Ohio Public Energy Council (NOPEC), a group of more than 100 communities that purchase green power in bulk to reduce prices. Additionally, American Municipal Power-Ohio (AMP-Ohio) chose Green Mountain Energy to supply its 5 member cities. In late 2001, a group of Ohioans toured several wind plants in Pennsylvania as guests of Green Mountain Energy.

Several Ohio municipal electric systems have expressed interest in a wind power joint venture through AMP-Ohio, with a goal of installing four 1.5-MW wind turbines. At the first site under consideration, near Bowling Green, wind monitoring is complete. GEO is willing to provide this site's wind monitoring data and other information to interested parties.

Figure 7. Ohio Wind Monitoring Sites
Source: ***The Columbus Dispatch***

The State of Ohio's Department of Development offers renewable energy loans up to $25,000 for residents and up to $500,000 for businesses. The loans apply to purchasing and installing wind turbines and other renewable energy technologies. The state also offers commercial and industrial energy consumers a corporate exemption from property and sales taxes on certain conversion facilities including wind power equipment.

Ohio law requires investor-owned utilities to offer a net metering option to customer-generators who own qualifying systems including wind turbines. There is no cap on system size, but each utility is required to interconnect systems only up to 0.1 percent of its in-state customer peak demand. In 2002 the utilities won a court battle to reduce the rate at which they pay customers for the electricity; it appeared likely that excess generation will be purchased at the utility's avoided cost.

Bowling Green Municipal Utilities offers net metering and a standard interconnect permit for wind generators up to 25 kW. This public power utility is Ohio's only supplier of green power, which is generated from landfill gas and by low-impact hydropower. The utility is considering a large, 376-kW PV system on the rooftop of the Bowling Green State University hockey arena, in addition to locating several commercial wind turbines nearby.

Michigan

This Midwestern state is home to one of America's first green power marketing programs, Green Rate, which sells electricity from Traverse City's 600-kW wind turbine, built in 1996. The utility's green power premium is 1.58 cents/kWh, which amounts to about $7.58/month for the average home. Consumers Energy also began offering green power supplied by two 900-kW turbines installed near Mackinaw City, which increased Michigan's total wind power capacity to 2.4 MW (see Table 4). Customers can purchase blocks of green power equivalent to 10 percent,

50 percent, or 100 percent of their electricity consumption. The State of Michigan's Consumer and Industry Service (CIS) provides grants up to $5,000 for community renewable energy projects such as wind energy demonstrations or seminars.

In November 2002 the U.S. DOE's Chicago Regional Office hosted a successful Regional Native American Wind Workshop in Sault St. Marie to discuss wind resources and development opportunities on Tribal land. The State of Michigan also has established an official State Wind Working Group whose mission is to promote/encourage in-state wind energy developments. In 2003, the U.S. Department of Energy's Chicago Office will be providing financial support to establish a State of Michigan Wind Working Group. The assistance will help sponsor a series of wind meetings with Michigan key stakeholders for the purpose of gathering information to craft a statewide wind implementation plan.

Indiana

The state is interested in monitoring and mapping its wind energy resources for development opportunities. Indiana has a net billing program in place for qualifying facilities that generate less than 1,000 kWh per month, with the utility buying back the excess energy at the avoided cost. About 20 small wind power facilities statewide have signed up for this program.

Indiana provides a property tax exemption for wind power systems and other renewable sources that are broader than that of most other states, exempting storage and other affiliated equipment. Indiana also offers grants for distributed generation systems, alternative power and energy systems, and renewable energy technology demonstrations. All of these grants include wind power but apply to businesses and institutions, not residential generators.

PSI Energy, a Cinergy subsidiary serving Indiana, collects voluntary monthly donations from customers, which could lead to a green-power purchasing program.

The state in 2002 received financial support from the U.S Department of Energy for wind assessment. A new State of Indiana wind resource map will be developed and validated by 2004.

Missouri

Like Indiana, the State of Missouri's Department of Natural Resources (DNR) is interested in assessing its potential wind energy resources through a monitoring and mapping program. The state ranks 20th in wind energy potential in the U.S. and fourth in the Midwest.

City Utilities of Springfield offers a wind power option to customers, who can purchase 100-kWh blocks for $5.00. The green pricing program, called WindCurrent, equates to roughly 16 cents per day, reported the *Columbia Daily Tribune*. The utility purchases wind power from Western Resources, which operates a 1.5-MW wind project in Kansas. Aquila (formerly UtiliCorp) was the first utility to provide wind-generated power to residential customers in Missouri, beginning in 1999.

The City of Columbia has investigated the possibility of securing a 5-MW block of wind energy from a Kansas wind farm when its 80-MW energy agreement with AmerenUE expires in 2004. Municipal utility Columbia Water and Light was evaluating public demand for green power but perceives the expense to be a hindrance, while Columbia City Councilor John Coffman believes that the price difference is narrowing, said the *Tribune*. Missouri offers loans to local governments and public schools (K-12) for renewable energy projects including wind.

The U.S. Department of Energy's Chicago Regional Office in 2002 provided financial support to launch a State Anemometer Loan program. Ten 20-meter towers and accessories are available to Missourians interested in assessing wind resources on their land for potential

development opportunities. In March 2003, the U.S. Department of Energy's Chicago Regional Office sponsored a one-day Missouri Renewable Energy Conference and Exhibition. Over 250 people turned out to learn about the benefits, technologies, applications, and economic development opportunities associated with renewable energy. Also, the U.S. Department of Energy's Chicago Regional Office will provide financial support to Missouri DNR for the development of a new state wind resource map. The map will be completed, validated and released in 2004.

Table 1. Minnesota's Wind Power Developments
(Source: U.S. DOE, Minnesota Dept. of Commerce, American Wind Energy Association)

Name/Town or County	Owner/ Developer	Start Date	Capacity, MW	Affiliated Utility User/ Power Purchaser	Turbine Manufacturer	Number of Turbines	Turbine Size, kW
Existing							
Crookston	Phoenix Industries	1987	0.8	Otter Tail Power[d]	N/A	N/A	N/A
Marshall	Navitas Energy[a]	1992	0.6	Marshall Municipal Util.	WindWorld	5	120
Buffalo Ridge	Kenetech Windpower	1994	24.8	Xcel Energy[c]	Kenetech	73	340
Lac qui Parle Valley Sch.	Lac qui Parle Valley Sch.	1997	0.2	Lac qui Parle Valley Sch.	NEG Micon	1	225
Chandler Hills I	enXco, PRC[b]	1998	2.0	Great River Energy[d]	Vestas	3	660
Lake Benton I	GE Wind	1998	107.3	Xcel Energy	Zond	143	750
Woodstock	Edison Capital	1999	10.2	Xcel Energy	Vestas	18	600
Moorhead I	Moorhead Public Service[d]	1999	0.8	Moorhead Public Service[d]	NEG Micon	1	750
Hendricks (Lakota Rdg.)	Edison Capital	1999	11.3	Xcel Energy	NEG Micon	15	750
Lk.Benton/Pipestone	FPL Energy	1999	103.5	Xcel Energy	Zond	138	750
Hendricks (Shaokatan H.)	Edison Capital	1999	11.9	Xcel Energy	Vestas	18	660
dispersed project	--	2000	5.9	Xcel Energy	Vestas	24	660
N. Shaokatan/Hendricks	CHI Energy	2000	11.9	Xcel Energy	Vestas	18	660
Ruthton Wind Farm	CHI Energy	2001	15.8	Xcel Energy	Vestas	22	660
Averill (Agassiz Beach)	CHI Energy	2001	2.0	Xcel Energy	Vestas	3	660
Elk River (Metro Wind)	CHI Energy	2001	0.7	Xcel Energy	Vestas	1	660
Chandler Hills II	enXco, PRC[b]	2001	4.0	Great River Energy[d]	Vestas	6	660
Pipestone Co./Kas Farms	Kas Brothers	2001	1.5	Xcel Energy	NEG Micon	2	750
Hendricks (Lkvw. Rdg.)	Otter Tail Power[d]	2001	0.9	Otter Tail Power[d]	NEG Micon	1	900
Olsen W. Farm (Pipestn.)	Olsen Farm	2001	1.5	Xcel Energy	NEG Micon	2	750
Wilmont	Navitas Energy	2001	1.5	Alliant Energy[d]	NEG Micon	1	1500
Wilmont	Navitas Energy	2001	0.9	SMMPA[d]	NEG Micon	1	900
Moorhead (II)	Moorhead Public Service[d]	2001	0.8	Moorhead Public Service[d]	NEG Micon	1	750
Total Existing Capacity			**319.9**				

Table 1. Minnesota's Wind Power Developments, cont'd.
(Source: U.S. DOE, Minnesota Dept. of Commerce, American Wind Energy Association)

Name/Town or County	Owner/Developer	Start Date	Capacity, MW	Affiliated Utility User/ Power Purchaser	Turbine Manufacturer	Number of Turbines	Turbine Size, kW
Under Development/Planned							
Murray County	Xcel, Chanaramble	2002	79.5	N/A	GE Wind	50	1,600
Nobles County	Missouri River[d]	2002	1.8	Worthington/Missouri Riv.	NEG Micon	2	900
Pipestone/Murray Cos.	Navitas Energy	2002	130.5	N/A	GE Wind	87	1,500
Nobles County (S. Minn.)	Navitas Energy	2002	0.9	N/A	NEG Micon	1	900
Hendricks/Lincoln Cos.	Navitas, Shaokatan	2002	0.9	N/A	NEG Micon	1	900
Dodge Center	ReGen Technologies	2002	9.0	Xcel Energy	NEG Micon	10	900
Total Planned Capacity			**222.6**				
Total Existing and Planned			**542.5**				

[a] Navitas Energy was formerly Northern Alternative Energy.

[b] PRC is Project Resources Inc.

[c] Xcel Energy was formerly Northern States Power Co.

[d] Green power program.

Table 2. Iowa's Wind Power Developments
(Sources: www.awea.org and www.state.ia.us/dnr/energy/)

Name/Town or County	Owners/Operators/Partners	Capacity	Turbine Mfr., Number
Large Commercial Projects		*MW*	
Storm Lake/Alta			
Storm Lake I	GE Wind*	112.5	Zond, 150
Storm Lake I	GE Wind	80.3	Zond, 107
Storm Lake II (Buena V.)	Waverly Light and Power	1.5	Zond, 2
subtotal Storm Lake		194.3	
Top of Iowa/Joice	Entergy, partners	80.1	NEG Micon, 89
Clear Lake	FPL Energy	42.0	NEG Micon, 56
Algona	consortium/Cedar Falls	2.3	Zond, 3
Sibley	Navitas Energy**	1.2	2
Subtotal Large Projects		**319.9**	
Small School Projects		*kW*	
Spirit Lake	Spirit Lake Community School District	1,000	WindWorld, NEG Micon
Akron	Akron-Westfield Community School District	600	Vestas, 1
Forest City	Forest City Community School District	600	Nordex, 1
Nevada	Nevada High School	450	WindWorld, 1
Royal	Clay Central/Everly Community School District	95	N/A
Fenton	Sentral Community School District	65	Windmatic
Clarion	Goldfield Community School District	50	Atlantic Orient
Small Commercial Projects		*kW*	
Waverly II	Waverly Light and Power	900	NEG Micon, 1
Nevada	Story County Hospital	250	Vestas, 1
Adair	Schafer Systems, Inc.	225	Vestas, 1
Sioux City	KTFC Midwest Bible Radio	65	N/A
Williams	Boondocks Truck Stop	65	N/A
Des Moines	Iowa State Fairgrounds	10	N/A
Linn Grove	New Prairie Home Technologies	10	N/A
West Des Moines	Sun Prairie Apartments	10	N/A
Small Private Systems	N/A	>465	>19
Subtotal Small Projects		**4.9 MW**	
Total Existing Capacity		**324.8 MW**	

Table 2. Iowa's Wind Power Developments, cont'd. (Sources: www.awea.org and www.state.ia.us/dnr/energy/)

Name/Town or County	Owners/Operators/Partners	Capacity	Turbine Mfr.
Planned			
Hancock County	FPL Energy	98.0 MW	NEG Micon
Hardin County	Eldora, New Providence Schools	250 kW	N/A
Sioux County	Orange City Municipal Utility	750 kW	N/A
TBD, Top of Iowa II	Top of Iowa	100.5 MW	N/A
Wall Lake	City of Wall Lake	950 kW	N/A
Northwood	Northwood Kensett Community Schools	900 kW	Nordex, 1
Sergeant Bluff	City of Sergeant Bluff	750 kW	N/A
Sioux Rapids	Sioux Central Schools	750 kW	N/A
Spirit Lake	Clipper Windpower	43.5 MW	N/A
Lenox	Lenox Municipal Utility	750 kW	N/A
Total Planned Capacity		**247.1 MW**	
Total Existing and Planned		**571.9 MW**	

* GE Wind was formerly Enron Wind, which was formerly Zond.

** Navitas Energy was formerly Northern Alternative Energy.

Table 3. Wisconsin's Wind Power Developments (Source: www.awea.org)

Name/Town or County	Site Owners/Operators	Capacity, MW	Turbine Mfr., Number
Montfort/Eden, Iowa Co.	GE Wind	30.0	GE Wind, 20
Rosiere/Kewaunee Co.	Madison Gas and Electric	11.2	Vestas, 17
Lincoln/Kewaunee Co.	Wisconsin Public Service	9.2	Vestas, 14
Byron/Fond du Lac Co.	Alliant Energy	1.3	Vestas, 2
Zirbel (Glenmore)/De Pere	Wisconsin Public Service, three other WI utilities	1.2	Tacke, 2
Total Capacity		**52.9**	

Table 4. Other Midwestern Wind Power Developments (Source: www.awea.org)

Name/Town or County	Site Owners/Operators	Capacity, MW	Turbine Mfr., Number
Illinois – Planned			
Champaign	Illinois Power/NEG Micon (demo project)	0.9	NEG Micon, 1
Mendota Hills/Lee County	Navitas Energy[a]	51.0	NEG Micon, 30-55
Crescent Ridge/Bureau Co.	Illinois Wind Energy	48.0	NEG Micon, 34
Total		**99.9**	
Michigan – Existing			
Traverse City	Traverse City Light and Power	0.6	Vestas, 1
Mackinaw City	Mackinaw City	1.8	NEG Micon, 2
Total		**2.4**	

[a] Navitas Energy was formerly Northern Alternative Energy.

Table 5. Summary of Financial Incentives for Wind Power in the Midwest (Sources: www.awea.org/pubs/inventory/html and www.ies.ncsu.edu/dsire/)

State	Property Tax Exemption	Sales Tax Exemption	Loans	Grants	Green Pricing	Utility Mandates	Net Metering	Other
Illinois	Yes; valuation no more than conventional system	No	No	Yes; RERP, IL Clean Energy Community Foundation, Alt.Energy Bond Fund	Chicago municipal aggregate purchases green power; IL state buildings planning to purchase green power	No	Yes; ComEd experimental program ≤40 kW, cap 0.1% of utility's peak demand	Public benefits trust fund and revenue bonding; Renewable Portfolio Goal
Indiana	Yes	No	No	Yes; DG, Alt.Power &Energy, Renewable demos	PSI Energy fund to develop green power sources	No	Yes; >1,000 kWh/month	Renewables included in demand-side management programs
Iowa	Yes; 100% of project value for 5 yr; local option spec.asst.	Yes; total cost of equipment and materials exempt	Yes; Energy Bank - Program, AERLP	Yes; research grants through Iowa Energy Center	Yes; 3 utilities offer green pricing; all must offer green power options by 2004	IOUs must purchase total of 105 MW/yr of generation from renewables	Yes; IOUs purchase at avoided cost	State supports wind energy demonstration projects
Michigan	No	No	No	Yes; govt, nonprofit community energy projects	Yes; 2 utilities offer green pricing	No	Possible	--
Minnesota	Yes; all wind energy system exempt, but production tax began in 2002	Yes; total cost of equipment and materials exempt	Yes; agric. improvement, value-added stock	Production tax credit 1.5 cents/kWh	Yes; 6 utilities/ coops offer green pricing; all utilities must offer green power option	Xcel must purchase 400 MW wind power through 2012	Yes; ≤40 kW, IOUs purchase at average retail rate, no statewide cap	Renewable devel. fund, non-mandated renewable goal, wind easements

Table 5, cont'd. Summary of Financial Incentives for Wind Power in the Midwest (Sources: www.awea.org/pubs/inventory/html and www.ies.ncsu.edu/dsire/)

State	Property Tax Exemption	Sales Tax Exemption	Loans	Grants	Green Power	Utility Mandates	Net Metering	Other
Missouri	No	No	Yes for local government and K-12 schools	No	City of Springfield wind power option	No	No	--
Ohio	Yes, comm./ ind.	Yes, comm./ ind.	Yes; renewable projects, effic.	No	NOPEC, AMP-Ohio aggregates purchase	No	Yes; cap 1.0% of utility's peak demand	--
Wisconsin	Yes; any value added is exempt	No	Yes; WI Focus on Energy	Yes; renewable energy projects	Yes; 6 utilities/ coops offer green pricing	Utilities must deliver 0.5% from renewables in 2001, increasing to 2.2% by 2011	Yes; ≤20 kW, IOUs purchase at retail rate, no statewide cap	Cash-back rebates, public benefits fund, wind access

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Website: www.iowawind.org
E-mail: info@iowawind.org

Utilities/Energy Companies

Alliant Energy
222 W. Washington Ave.
P.O. Box 192
Madison, IA 53701-0192
800-255-4268
Fax: 608-758-1459
Website: www.alliantenergy.com
E-mail: customercare@alliant-energy.com

Cedar Falls Utilities
Utility Parkway
Cedar Falls, IA 50613
319-266-1761
Fax: 319-266-8158
Website: www.cfunet.net
Wind Energy Green Pricing
Betty Zeman
319-268-5280

Waverly Light and Power Co.
1002 Adams Pkwy.
P.O. Box 329
Waverly, IA 50677
319-352-6251
Fax: 319-352-6254
Website: www.waverlyia.com/WLP
General Manager
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E-mail: glenn@wlpnet.net

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Michigan Department of Consumer and Industry Services
Energy Office
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517-241-6280
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Green Power

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Michigan Independent Power Producers Association
Michigan Green Power Cooperative
517-676-3974

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Minnesota Department of Commerce
Energy Division
Energy Information Center
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St. Paul, MN 55101-3165
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651-296-5175
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Rural Finance Authority
90 W. Plato Blvd.
St. Paul, MN 55107-2094
Fax: 612-296-9388
Website: www.mda.state.mn.us/AgFinance
Low-Interest Loan Program
Curtis Pietz

612-297-1246
E-mail: curtis.pietz@state.mn.us
Value-Added Stock Loan Program
Wayne Marzolf
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Minnesota Public Utilities Commission
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St. Paul, MN 55101-2147
800-657-3782
651-269-7124
Fax: 651-297-7073
Website: www.puc.state.mn.us/
Green Pricing
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612-374-2261
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Wellspring Green Pricing
Tim Seck

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Elk River, MN 55330-0800
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Duluth, MN 55802
Website: www.mnpower.com
WindSense Green Pricing
Al Lian
218-722-1972

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500 Center Ave.
P.O. Box 779
Moorhead, MN 56561-0779
Website: www.mpsutility.com
Capture the Wind Green Pricing
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Xcel Energy
414 Nicollet Mall RS6
Minneapolis, MN 55401
612-330-7780
Website: www.xcelenergy.com

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Missouri Department of Natural Resources
Energy Center
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Jefferson City, Missouri 65102-0176
Phone: 573-751-8386
Fax: 573-751-6860
Website: www.dnr.state.mo.us/energy

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Springfield, MO 65801-0551
Website: www.cityutilities.net
WindCurrent Green Pricing
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Columbia Water and Light
701 E. Broadway
P.O. Box 6015
Columbia, MO 65205
573-874-7325
Website: www.gocolumbiano.com

Ohio

Ohio Department of Development
Office of Energy Efficiency
77 S. High Street, 26th Floor
Columbus, OH 43215
Website: www.odod.state.oh.us/cdd/oee
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2300 W. Case Rd.
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Local Renewable Energy Groups

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Bill Spratley, Executive Director
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Utilities/Energy Companies

City of Bowling Green Municipal Utilities
304 N. Church St.
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Bowling Green, OH 43402
Website: www.bgohio.org
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Green Mountain Energy
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1533 Lake Shore Drive
Columbus, OH 43204
614- 884-0560
www.greenmountain.com

Wisconsin

Wisconsin Department of Administration
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P.O. Box 7868
Madison, WI 53707-7868
Website: www.doa.state.wi.us
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Wisconsin Focus on Energy
800-762-7077
Website: www.focusonenergy.com
Renewable Energy Yellow Pages
Website: www.focusonenergy.com/page.jsp?pageId=806

Residential Renewable Programs
E-mail: ResRenewinfo@focusonenergy.com
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E-mail: BizRenewinfo@focusonenergy.com

Wisconsin Public Service Commission
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Wisconsin Energy Conservation Corp.
211 S. Paterson St., 3rd floor
Madison, WI 53703
Website: www.weccusa.org
Renewable Production Rebates
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Renewable Production Rebates
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Website: www.dairynet.com
Evergreen Renewable Energy Program
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Madison Gas and Electric Co.
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Green Bay, WI 54307-9002
800-450-7260
Website: www.wisconsinpublicservice.com
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Wisconsin Wind Project
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Washington, DC 20001
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Website: www.awea.org
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Utility Wind Interest Group (UWIG)
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703-351-4492, ext. 121
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E-mail: karenl@electrotek.com

Wind Farm Developers/ Equipment Manufacturers

Bergey Windpower Company
2001 Priestley Avenue
Norman, OK 73069
405-364-4212
Fax: 405-364-2078
Website: www.bergey.com

Southwest Wind power
P.O. Box 2190
2131 N. First Street
Flagstaff, AZ 86003-2190
520-779-9463
Fax: 520-779-1485
Website: www.windenergy.com

Atlantic Orient USA
P.O. Box 1097 Farrel Farm Road
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Norwich, VT 05055
802-649-5446
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GE Wind Energy (formerly Enron Wind)

13000 Jameson Rd.
Tehachapi, CA 93561
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Navitas (formerly Northern Alternative Energy)
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Updates to this report may be downloaded from the CRO website at:
http://www.eere.energy.gov/cro/pdfs/windsumm.pdf